

WHAT IS CLAIMED IS:

1. A surgical instrument, comprising:

an elongate member extending along an axis; and

at least one cutting element engaged with said elongate member and being

5 transitional between a retracted configuration for extending through a first portion of a passage in bone and an expanded configuration for forming a second portion of the passage having an enlarged cross-section; and

wherein axial displacement of said at least one cutting element relative to said elongate member causes said at least one cutting element to transition between said retracted

10 and expanded configurations.

2. The instrument of claim 1, wherein said elongate member and said cutting

element define bearing surfaces slidably engaging one another during said axial

displacement, at least one of said bearing surfaces including a ramped section configured to

15 transition said cutting element between said retracted and expanded configurations during said axial displacement.

3. The instrument of claim 1, wherein said elongate member defines an axial

channel including a ramped section, said at least one cutting element being at least partially

20 disposed within said channel and slidably displaced along said ramped section to transition said cutting element between said retracted and expanded configurations.

4. The instrument of claim 3, further comprising an actuator mechanism engaged with said elongate member and coupled to said at least one cutting element, wherein axial displacement of said actuator mechanism relative to said elongate member slidably displaces said cutting element along said ramped section of said channel to transition said cutting element between said retracted and expanded configurations.

5. The instrument of claim 4, wherein said actuator mechanism comprises a collet slidably engaged about said elongate member wherein axial displacement of said collet relative to said elongate member slidably displaces said cutting element along said ramped section of said channel to transition said cutting element between said retracted and expanded configurations.

10 6. The instrument of claim 1, wherein said elongate member comprises a sleeve, said at least one cutting element being outwardly biased toward said expanded configuration and being at least partially disposed within said sleeve to selectively maintain said at least 15 one cutting element in said retracted configuration, said at least one cutting element being transitionable between said retracted and expanded configurations by axially displacing said at least one cutting element relative to said sleeve.

20 7. The instrument of claim 6, further comprising an actuator mechanism including a shaft disposed within said sleeve and coupled to said cutting element, wherein axial displacement of said shaft relative to said sleeve transitions said at least one cutting element between said retracted and expanded configurations.

8. The instrument of claim 6, wherein said at least one cutting element is pivotally coupled to said shaft and is aligned in an axial orientation when in said retracted configuration and in angular orientation when in said expanded configuration.

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9. The instrument of claim 1, wherein a portion of said elongate member defines a tapping thread configured to cut threads along the first portion of the passage.

10. A surgical instrument, comprising:

10 an elongate member;

a first cutting element disposed along said elongate member for forming a first portion of a passage in bone; and

15 a second cutting element disposed along said elongate member and being transitional between a retracted configuration for extending through the first portion of the passage and an expanded configuration for forming a second portion of the passage having an enlarged cross-section.

11. The instrument of claim 10, wherein said first cutting element comprises a tapping thread.

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12. The instrument of claim 10, wherein said first cutting element comprises a drill flute.

13. The instrument of claim 10, wherein said first cutting element comprises a distal end portion of said elongate member.

14. The instrument of claim 13, wherein said distal end portion of said elongate 5 member is configured to be self-drilling and self-tapping.

15. The instrument of claim 10, wherein said second cutting element comprises a cutting blade extending laterally from said elongate member when transitioned toward said expanded configuration.

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16. The instrument of claim 15, wherein said elongate member defines a channel extending along an axis with said cutting blade being at least partially disposed within said channel, at least one of said channel and said cutting blade including a ramped section configured to transition said cutting blade between said retracted and expanded 15 configurations when said cutting blade is axially displaced along said channel.

17. The instrument of claim 16, further comprising an actuator mechanism engaged with said elongate member and coupled to said cutting blade, wherein axial displacement of said actuator mechanism relative to said elongate member axially displaces 20 said cutting blade along said channel to transition said cutting blade between said retracted and expanded configurations.

18. The instrument of claim 10, wherein said first cutting element comprises a tapping thread and wherein said second cutting element comprising a cutting blade.

19. The instrument of claim 18, wherein said cutting blade includes a cutting edge 5 having a profile corresponding to a profile of said tapping thread.

20. A surgical instrument, comprising:
an elongate member;
a tapping thread defined along a portion of said elongate member for forming a
10 threaded portion of a passage in bone; and
a cutting blade engaged with said elongate member and being transitionable between
a retracted configuration for extending through the threaded portion of the passage and an
expanded configuration for forming an enlarged cross-sectional portion of the passage.

15 21. The instrument of claim 20, wherein said elongate member defines an axial channel including a ramped section, said cutting blade being at least partially disposed within said channel and slidably displaceable along said ramped section to transition said cutting blade between said retracted and expanded configurations.

20 22. The instrument of claim 21, further comprising a collet engaged with said comprises a collet slidably engaged about said elongate member and coupled to said cutting blade so that axial displacement of said collet relative to said elongate member slidably displaces said cutting blade along said ramped section of said channel to transition said

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cutting blade between said retracted and expanded configurations.

23. The instrument of claim 20, wherein said cutting blade includes a cutting edge having a profile corresponding to a profile of said tapping thread.

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24. A surgical instrument, comprising:

means for tapping threads along a portion of a passage in bone;

means for forming an enlarged cross-sectional portion of the passage; and

means for transitioning said means for forming between a retracted configuration for

10 extending through the threaded portion of the passage and an expanded configuration for forming the enlarged cross-sectional portion of the passage.

25. A surgical instrument, comprising:

an elongate member extending along an axis and including an expandable portion

15 having at least one cutting element transitionable between an axial orientation for forming an axial passage in bone and an angular orientation for enlarging a portion of the axial passage.

26. The instrument of claim 25, wherein said at least one cutting element is

20 pivotally coupled to said elongate member.

27. The instrument of claim 26, wherein said at least one cutting element is

pivotally coupled to a distal end portion of said elongate member.

28. The instrument of claim 25, wherein said at least one cutting element is outwardly biased toward said angular orientation and is initially maintained in said axial orientation by a retention element.

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29. The instrument of claim 28, wherein said retention element is a sleeve, said at least one cutting element being at least partially disposed within said sleeve to selectively maintain said at least one cutting element in said axial orientation, said at least one cutting element being transitional between said retracted and expanded configurations by axially displacing said at least one cutting element relative to said sleeve.

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30. The instrument of claim 29, further comprising an actuator mechanism including a shaft disposed within said sleeve and coupled to said at least one cutting element, wherein axial displacement of said shaft relative to said sleeve transitions said at least one cutting element between said axial and angular configurations.

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31. The instrument of claim 30, wherein said at least one cutting element is pivotally coupled to said shaft.

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32. The instrument of claim 25, wherein the axial passage is formed by applying an axial force to said elongate member; and
wherein the axial passage is enlarged by applying a rotational force to said elongate member.

33. The instrument of claim 32, further comprising a handle coupled to said elongate member, said handle configured to transmit said axial and rotational forces to said elongate member.

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34. The instrument of claim 25, further comprising a retention element configured to selectively maintain said at least one cutting element in said axial orientation.

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35. A surgical instrument, comprising:
an elongate member; and
at least one cutting element engaged with said elongate member and being
transitionable between a retracted configuration for extending through a passage in bone and
an expanded configuration for enlarging a portion of the passage, said at least one cutting
element being outwardly biased toward said expanded configuration; and
15 a retention element interacting with said at least one cutting element to selectively
maintain said at least one cutting element in said retracted configuration.

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36. The instrument of claim 35, wherein said retention element comprises a sleeve,
said at least one cutting element being at least partially disposed within said sleeve to
selectively maintain said at least one cutting element in said retracted configuration.

37. The instrument of claim 36, further comprising an actuator mechanism
including a shaft disposed within said sleeve and coupled to said at least one cutting

element, wherein axial displacement of said shaft relative to said sleeve transitions said at least one cutting element between said retracted and expanded configurations.

38. The instrument of claim 37, wherein said at least one cutting element is
5 pivotally coupled to said shaft.

39. The instrument of claim 35, wherein said at least one cutting element is
pivotally coupled to said elongate member.

10 40. The instrument of claim 39, further comprising a pair of said cutting elements
pivotally coupled to said elongate member.

41. The instrument of claim 35, wherein said at least one cutting element is
coupled to a distal end portion of said elongate member.

15 42. The instrument of claim 35, wherein said at least one cutting element is
arranged in an axial orientation when in said retracted configuration and in an angular
orientation when in said expanded configuration.

20 43. The instrument of claim 35, wherein the axial passage is formed by applying
an axial force to said elongate member; and
wherein the axial passage is enlarged by applying a rotational force to said elongate
member.

44. The instrument of claim 43, further comprising a handle coupled to said elongate member, said handle configured to transmit said axial and rotational forces to said elongate member.

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45. A surgical method, comprising:

providing a surgical instrument including an elongate member and at least one cutting element engaged with the elongate member and being transitionable between a retracted configuration and an expanded configuration;

10 forming a passage in bone;
displacing the cutting element along the passage while in the retracted configuration;
transitioning the cutting element to the expanded configuration and forming an
enlarged cross-section portion of the passage; and
transitioning the cutting element to the retracted configuration and removing the
15 surgical instrument from the passage.

46. The method of claim 45, further comprising:

providing a bone anchor;

inserting the bone anchor into the passage; and

20 at least partially filling the enlarged cross-section portion of the passage with an anchoring material.

47. The method of claim 46, wherein the bone anchor includes an axial opening extending at least partially therethrough and a least one fenestration opening communicating with the axial opening; and

wherein the inserting comprises positioning the at least one fenestration opening

5 adjacent the enlarged cross-sectional portion of the passage; and

wherein the filling comprises injecting the material through the axial passage and out the at least one fenestration opening.

48. The method of claim 47, wherein the anchoring material comprises bone

10 cement.

49. The method of claim 46, wherein the bone anchor is a bone screw; and

wherein the inserting comprises threading the bone screw into the passage.

15 50. The method of claim 45, wherein the elongate member defines a tapping

thread; and

wherein the forming comprises tapping at least a portion of the passage.

51. The method of claim 45, wherein the elongate member includes a drilling

20 portion; and

wherein the forming comprises drilling at least a portion of the passage.

52. The method of claim 45, wherein the cutting element extends from a distal end of the elongate member; and
wherein the forming comprises driving the cutting tip into the bone.

5 53. The method of claim 45, wherein the transitioning results from axially displacing the at least one cutting element relative to the elongate member.

54. The method of claim 53, wherein the elongate member defines an axial channel including a ramped section, the at least one cutting element being at least 10 partially disposed within the channel; and
wherein the transitioning results from slidably displacing the at least one cutting element along the ramped section.

55. The method of claim 53, wherein the elongate member comprises a sleeve, the 15 at least one cutting element being outwardly biased toward the expanded configuration and being at least partially disposed within the sleeve to selectively maintain the at least one cutting element in the retracted configuration; and
wherein the transitioning results from axially displacing the at least one cutting element relative to the sleeve.